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URBAN LAND

NEWS AND TRENDS . . .

IN CITY DEVELOPMENT

PUBLISHED BY URBAN LAND INSTITUTE

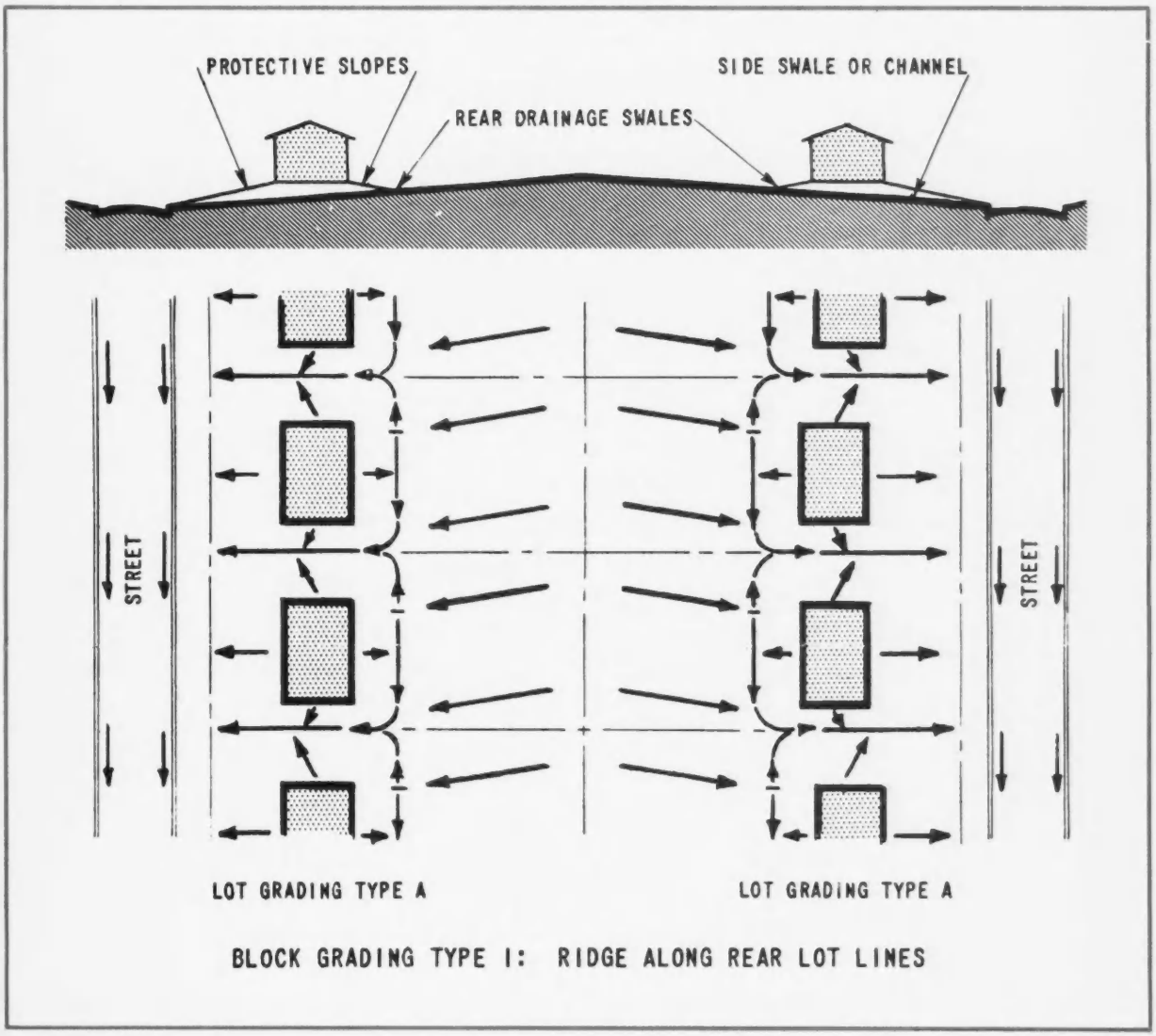
February 1954

BLOCK AND LOT GRADING

Lot Improvements, Data Sheet 72

Federal Housing Administration

(Article starts on Page 3)



BLOCK GRADING TYPE I: RIDGE ALONG REAR LOT LINES

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Plan-itorial . . .

U. L. I. Activities — Present and Future

Activities in urban areas are constantly increasing in scope, a trend that is reflected in the widening interests of U.L.I. during the past months. A resume thus seems in order to bring our members up to date and to advise them of things to come.

Officers and Trustees for 1954

But first, a roll call of the men who will guide our operations during the coming year. The officers of the Institute who served it so well in 1953 were unanimously re-elected. They include: John McC. Mowbray, President, also President of the Roland Park Company, Baltimore; Robert P. Gerholz, 1st Vice President, head of Gerholz Community Homes, Flint, Mich; Waverly Taylor, 2nd Vice President; Henry S. Miller, Secretary, former Chairman of the Dallas, Tex., Planning Commission; L. D. McKendry, Treasurer, Vice President of the Chicago Title and Trust Company.

New Trustees elected by the membership are: C. J. Faherty, General Manager, Mortgage Loan and Real Estate Investment Dept., The Prudential Insurance Company of America, Newark, N. J.; Charles B. Shattuck, Los Angeles, Calif., past president of the National Association of Real Estate Boards; Robert C. Heinton, Vice President-Marketing, The Cleveland Electric Illuminating Co., Cleveland, Ohio; and Larry Smith, Larry Smith & Co., Seattle, Wash. Of these, the first two were elected for two-year terms, the others for three years.

Trustees re-elected for three-year terms were: David D. Bohannon, San Mateo, Calif.; John W. Galbreath, Columbus, Ohio; Paul L. McCord, Indianapolis; L. D. McKendry, Chicago; Herbert U. Nelson, Chicago; Hugh Potter, Houston; Hugh E. Prather, Sr., Dallas; Richard J. Seltzer, Philadelphia; Waverly Taylor, Washington, D. C.; and Foster Winter, Detroit.

Council Activities

The first of the Community Builders' Council plan analysis sessions for 1954 was held in Chicago in January. It was attended by over 100 Council members. The Council's spring meeting will be held in San Francisco May 27-29, and will include a full day of field inspection and two days of plan analysis. In September, a fall meeting will be held in Toronto, Ontario. Formal notices of these future meetings will be sent to Council members well in advance. U.L.I. members who may wish to affiliate with the Community Builders' Council should write to U.L.I. headquarters for further information.

The Central Business District Council will announce shortly a contest on urban transit which will, it is hoped, develop positive and practical contributions to the solution of the transit dilemma. The Council's book, "Crowded Streets" is now at the publishers and should be available about June 15. Advance orders are being accepted by the U.L.I. office at a pre-publication price of $4.50. This book will provide much-needed information on the problems of downtown districts and practical solutions to them.

The Industrial Council held a meeting in Memphis, Tenn. on January 28 at which approval was given to the preparation of two Technical Bulletins to be issued in 1954. One of these will deal with industrial land and space requirements; the other with the potential industrial uses of land made available by redevelopment.

Other Pending Publications

In addition to those already mentioned, the Institute now has at the printers the fourth revised edition of the Community Builders' Handbook. The value and popularity of this standard work on community development exhausted our inventory before the new edition could be made available, and a large volume of advance orders is already on hand. Publication date will be about March 15. The book has been revised and brought up to date, and should be in every

(Continued on Page 8)

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BROADER PLANNING STRESSED IN NEW HOUSING AND REDEVELOPMENT BILL

Identical bills have been introduced in the House of Representatives (H.R. 7839) and in the Senate (S. 2938) to give legislative sanction to the policies of the present Administration regarding slum clearance, urban redevelopment, and housing. Hearings are scheduled to begin in March.

The new approach to redevelopment, while continuing and in some respects extending the present system of federal loans, grants, and technical assistance, lays much greater stress on local government participation and on the encouragement of private investment in improved housing.

The bill proposes the conversion of the present urban redevelopment fund into an urban renewal fund. A municipality seeking federal aid for either redevelopment or public housing would be expected to propose, not simply a project as heretofore, but rather a complete program to include slum prevention and the rehabilitation of blighted areas as well as demolition and rebuilding.

Federal technical assistance and loans would be available for the preparation and execution of such a program, and Federal grants would meet not more than two-thirds of the cost of carrying it out, excluding certain items such as the cost of repair or rehabilitation work

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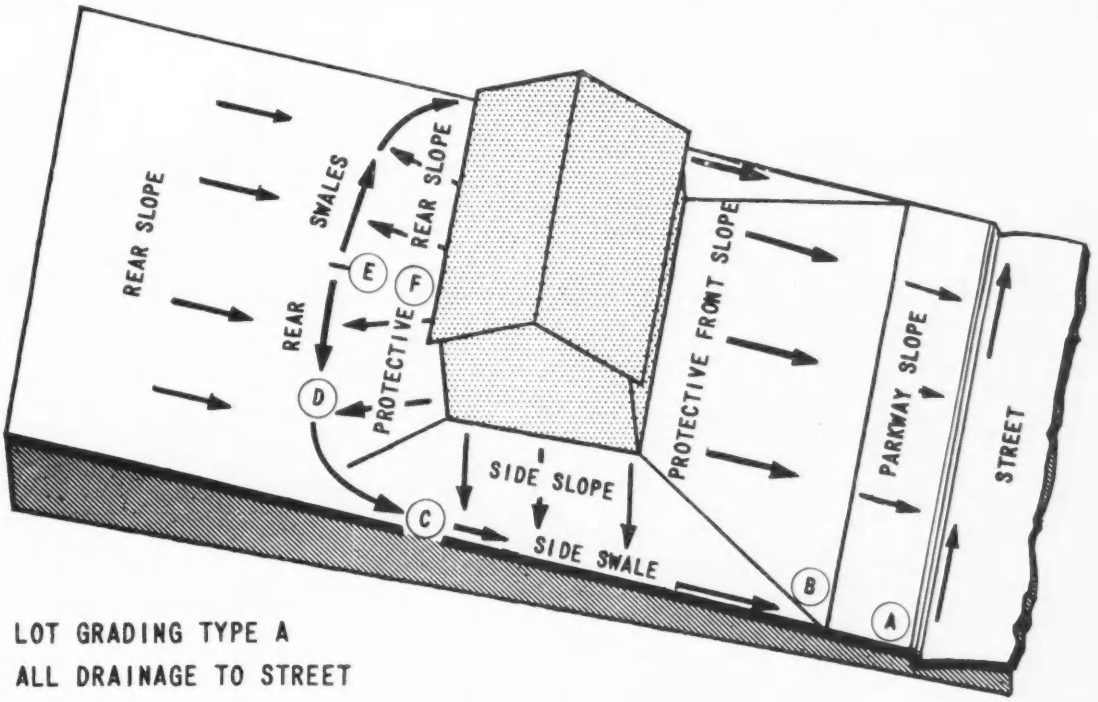


LOT GRADING TYPE A
ALL DRAINAGE TO STREET

Sample Computation of Grading Control Line A-F for a 60′ Lot on an 0.5% Street, With 28′ Setback, 28′ Building Depth and 2% Swales			Results Using 1% Swales	
A Curb-top on lot-line extension at high lot corner				
A-B Parkway slope: 12′ grass and walk at ¼″/ft. (2%)	3″	(0.3′)	3″	(0.3′)
B-C Side swale: 56′ grass at ¼″/ft. (2%)	14″	(1.2′)	7″	(0.6′)
C-D Swale turn with 10′ radius: 16′ grass at ¼″/ft.	4″	(0.3′)	2″	(0.2′)
D-E Rear swale: 12′ grass at ¼″/ft. (2%)	3″	(0.3′)	1″*	(0.1′)
E-F Protective rear slope up from high-point of swales	6″	(0.5′)	6″	(0.5′)
Sub-total A-F from curb-top to ground at rear bldg. wall	30″	(2.5′)	19″	(1.6′)
Minimum rise from curb-top to slab floor: 30″ + 8″	38″	(3.2′)	27″	(2.3′)
Minimum rise for wood floor using 8″ joists: 30″ + 19″	49″	(4.1′)	38″	(3.2′)

* 5′ Rear swale at 1%, or ½ [60 — 10 — 10 — (60 × .005 ÷ .01)] × .01

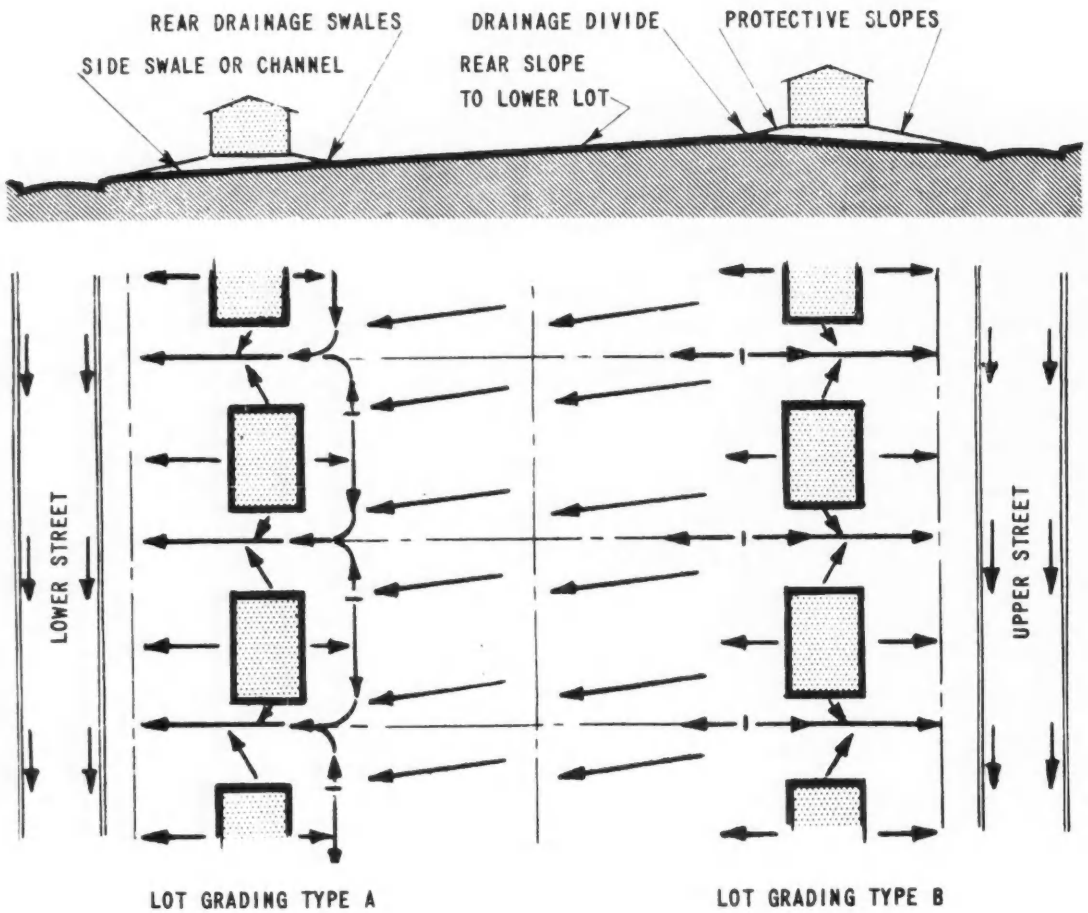
Editor's Note

Grading and drainage continue to be two of the major headaches of the residential land developer and home builder. The headaches start with the first shovel of earth turned and often do not end until long after the home buyer has worn down his doorstep and changed the color of his front door.

Cure for the cranial pain is often difficult, but preventive measures in the form of good site planning and engineering with careful adherence during construction can usually do the trick.

Recognizing this, the Federal Housing Administration is issuing a new data sheet known as "Block and Lot Grading, Data Sheet 72", which is designed to aid developers with this common problem, and in complying with the FHA lot grading standards issued in 1952 as "MPR Revision 36 of MPR Section 800, Lot Improvements".

Urban Land feels that an early acquaintanceship with this analysis will be of value to members who are dealing with FHA in various capacities. Consequently, with FHA's permission we are reproducing this data sheet. The FHA is now holding staff training meetings on this problem in each insuring office and will be glad to arrange local technical advisory meetings with builders, site planners, and engineers if so requested.



BLOCK GRADING TYPE 2: GENTLE CROSS-SLOPE

BLOCK AND LOT GRADING

Lot Improvements, Data Sheet 72

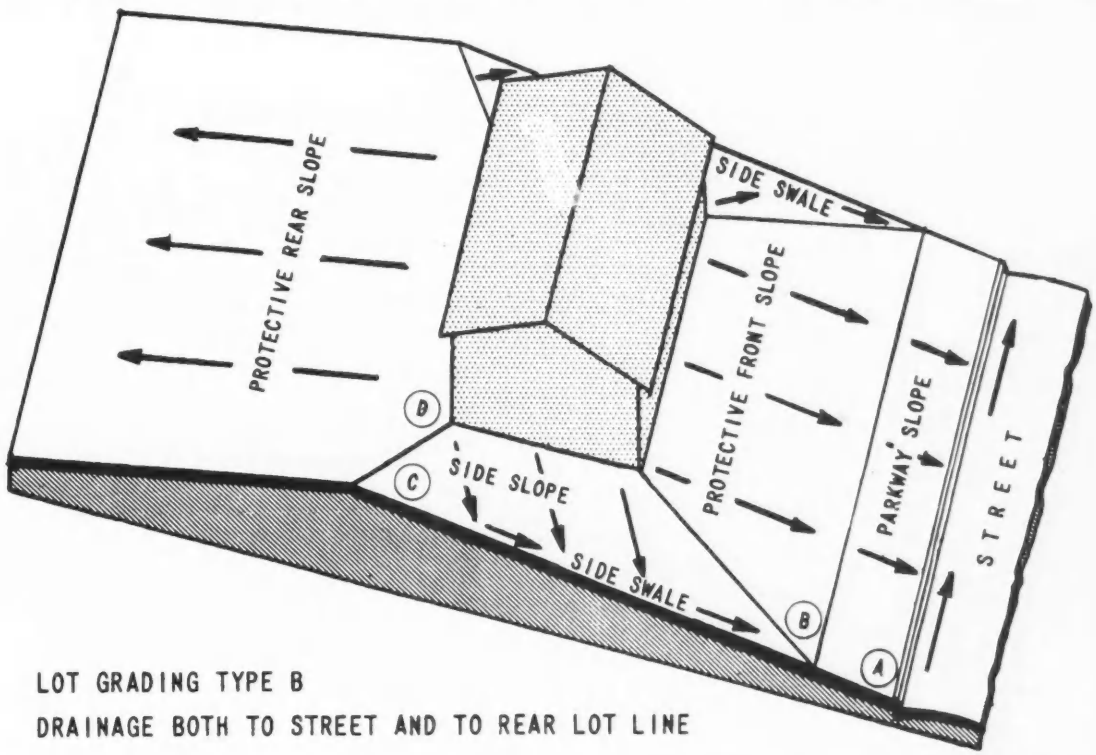
Federal Housing Administration

Proper grading is an important element in preventing wet basements, damp crawl spaces, eroding banks, muddy yards and overflowing septic tank systems. It also eliminates costly corrective work such as retaining walls, regrading operations and extra drainage pipe lines. To obtain such construction savings and property betterments requires know-how both by the builder's planners who determine the key grade elevations and by his superintendent and grading foreman out on the job.

Planning and execution of good grading involve certain basic steps pertaining to street layout, block grading and lot grading. The objective is to establish the street grades, floor elevations and lot grades in proper relation to each other and to existing topography, considering property protection, appeal and use.

Steps for the Builder's Planners

1. If the street layout is still subject to design or adjustment, fit it to the topography to obtain the most favorable types of block and lot grading which are compatible with other objectives.
2. Determine type of block grading for each block or portion of a block and indicate the lot grading type for each lot by identifying letter or drainage arrows.
3. Determine any easements and other provisions needed for satisfactory block drainage and erosion control.
4. Determine general lot grading limitations for local conditions, such as minimum gradients for grass swales and slopes and maximum for walks and drives.
5. For each type of house and lot, determine the specific lot grading limitations along a typical lot grading



LOT GRADING TYPE B

DRAINAGE BOTH TO STREET AND TO REAR LOT LINE

Sample Computation of Grading Control Line A-D For a 60′ Lot With 28′ Setback, 28′ Building Depth and 2% Swales			Results Using 1% Swales	
A Curb-top on lot-line extension at high lot corner				
A-B Parkway slope: 12′ grass and walk at ¼"/ ft. (2%)	3"	(0.3′)	3"	(0.3′)
B-C Side swale: 56′ grass at ¼"/ft. (2%)	14"	(1.2′)	7"	(0.6′)
C-D Protective side slope at extension of rear wall	6"	(0.5′)	6"	(0.5′)
Sub-total A-D from curb-top to ground at rear bldg. wall	23"	(1.9′)	16"	(1.3′)
Minimum rise from curb-top to slab floor: 23" + 8"	31"	(2.6′)	24"	(2.0′)
Minimum rise for wood floor using 8" joists: 23" + 19"	42"	(3.5′)	35"	(2.9′)

control line from the street to the house and determine the minimum street-to-floor rise; see sample computations for illustrated lot grading types.

6. If the street profiles are to be designed or adjusted, establish them so as to facilitate the provision of good drainage for both the lots and the streets, giving due consideration to existing topography and the lot limitations determined in 4 and 5 above.
7. For each property, determine proposed elevations for key points on the lot and for the dwelling floor, giving due consideration to street elevations, existing topography and the lot grading limitations determined in 4 and 5 above.
8. Discuss the objectives of the grading plans with the job superintendent and grading foreman.

Steps for the Man on the Job

1. Become familiar with the various grading types shown in this data sheet in order to create their essential features on the ground.
2. Follow your job grading plans and the suggestions of the builder's planner.
3. Set floor elevations only as shown on accepted drawings.
4. Complete all rough grading as soon as practicable to subgrades needed for final grading. This provides better drainage during construction operations.
5. Before topsoiling and finish grading each lot, set grade stakes at key points as needed (see illustrations), true-up the subgrades and check the entire lot for good drainage.

Block Grading Types

Block Grading Type 1 has a ridge along rear lot lines and each lot is graded to drain surface water directly to the street independent of other properties. It is the most simple and desirable type of block grading. Topography, however, will often require other block grading types.

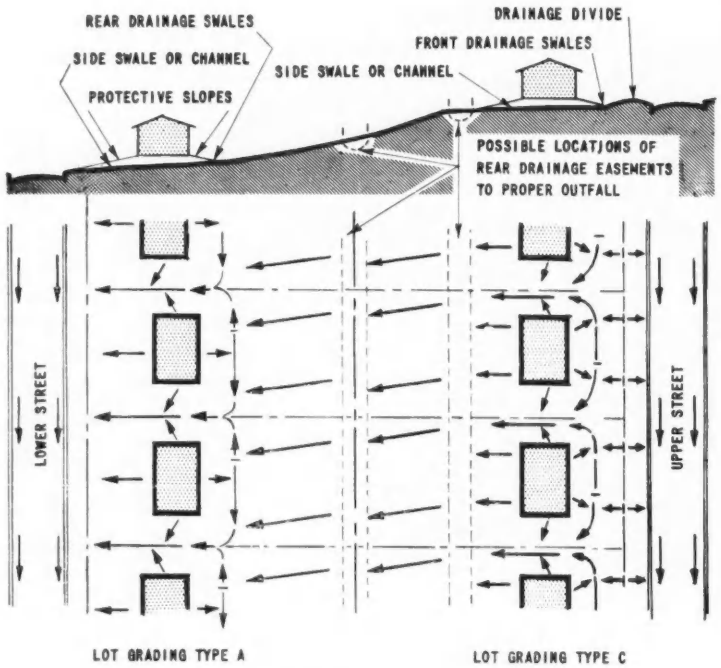
Block Grading Type 2 for a gentle cross-slope involves drainage of some surface water from lots on the high side of the block across the lower tier of lots. Difficulties are not encountered,

however, if slopes are gentle and if the water always drains over short routes to the streets and does not concentrate or accumulate in volume at any point inside the block.

Block Grading Type 3 for steep cross-slopes and Type 4 for a valley along rear lot lines require special provision for block drainage and erosion control.

Erosion is controlled by provision of intercepting drainage swales in easements at the top of the rear lot incline or at intermediate locations along it, and by treatment of the steep slope itself.

Drainage easements in Block Types 3 and 4 must have alignment, width and improvements appropriate for the expected use and maintenance. Assurance of permanent and adequate outfall is essential. The easements must be permanently established by proper legal methods, with continuous maintenance assured by public authority, property-owners' association or individual owners, as appropriate to the situation. Walls, buildings and any other obstructions to drainage flow, such as dense planting or tight fencing, must be legally prohibited in the easement area.



BLOCK GRADING TYPE 3: STEEP CROSS-SLOPE

Lot Grading Types

Protective slopes away from all sides of all buildings are essential elements of all lot grading types (see drawings). Their purpose is to drain roof water and other surface water away from all building walls and backfilled areas. Where such a protective slope meets a slope which drains towards the building, a drainage swale of adequate width, depth and longitudinal gradient is necessary to carry away the surface water without flooding against buildings or ponding any lot areas.

The location of these swales is directly related to the block grading type which, as shown in the block diagrams, actually determines the lot grading type.

In Lot Grading Type A (see drawing), rear swales behind the house carry surface water from the rear yard to side-yard swales which carry it to the street for disposal through the street gutters and the public storm drainage system.

For Lot Grading Type B which drains both to the street and to the rear lot line, only side-yard swales are needed. They should extend back of the line of the rear building wall; then splash blocks from rear roof downspouts should be placed to direct roof water to the side swales for drainage directly to the abutting street. Thus the amount of water carried on the rear slope to easements or other properties is kept as small as possible. This reduces erosion and disposal problems.

In Lot Grading Type C draining entirely to the rear lot line, front swales are essential to carry surface water from the front yard to side-yard swales which carry it to the rear for disposal in easements or across other properties. Proper cross-section of the street gutter, curb and parkway strip are essential to stop street water from flowing onto the lot.

Easements and erosion involving Lot Types B and C are discussed above with Block Grading Types 3 and 4.

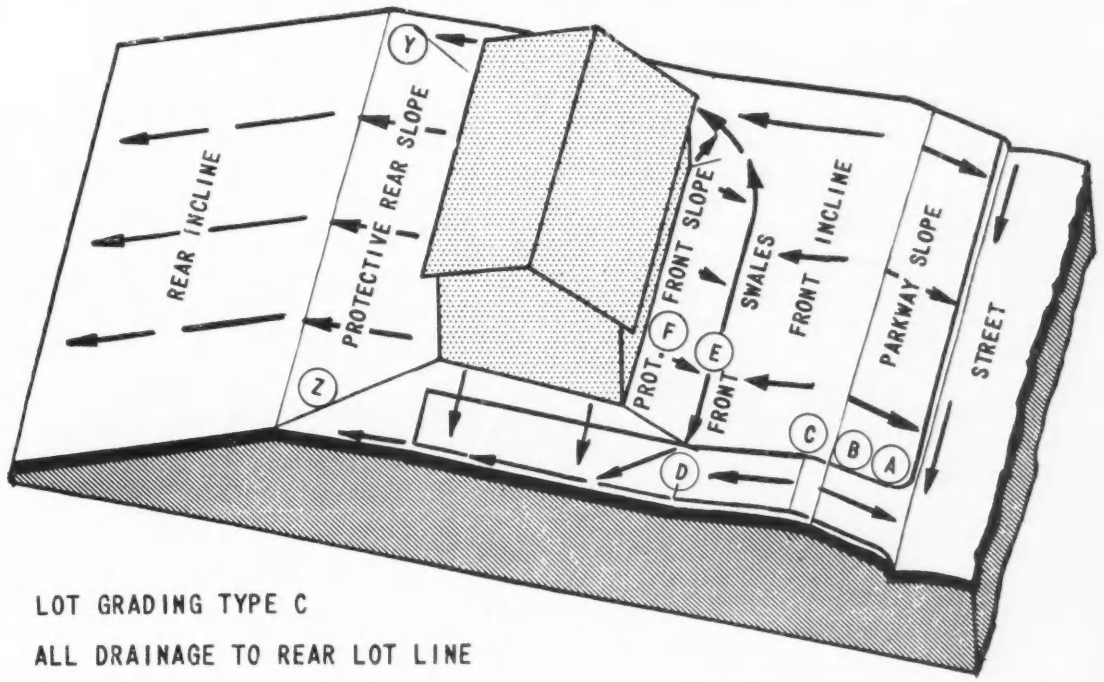
For lots with steep cross-slopes due to street gradients, similar lot grading types are used, the lot cross-slopes being taken up by walls or steep slopes along side lot lines or by changing grade levels along the front and rear house walls.

Where high slopes occur along side or rear lot lines, the lot line if possible should be located at the top of the slope. The appearance of the slope and any erosion from it directly affects the property below. That owner therefore is more interested in owning, stabilizing and maintaining the slope than is the owner of the property above whose outlook is over and beyond it.

Lot Grading Control Line

The single most important grade relationship for proper lot grading and drainage, is house floor elevation in relation to street elevation. If the floor elevation is too low in relation to adjoining street grades, adequate protective slopes and drainage swales cannot be provided to drain the lot satisfactorily. If the floor elevation is too high, unnecessary terracing, expensive outside stairs and awkward appearance will result.

Proper floor elevation and lot grades for any lot can be obtained by establishing on plans and on the ground a lot grading control line appropriate for the specific property. The line is located differently for each lot grading type as shown by the circles lettered "A", "B", "C", etc. in the accompanying lot diagrams. Each control line starts at the top of the street curb near the indicated high or low lot corner and ends at the point along the house wall where the outside finish grade controls the floor elevation. In the case of no street curbs, the starting point and elevation should be the normal curb loca-



LOT GRADING TYPE C

ALL DRAINAGE TO REAR LOT LINE

	Sample Computation of Grading Control Line A-F for a 60′ Lot, 28′ Setback, 13.5% Driveway, and 16′ Front Swale D-E at 2%			Results Using 1% Swales	
A	Curb-top at high side of drive near low lot corner				
A-B	Parkway slope: 12′ grass and walk at ¼″/ft. (2%)	3″	(0.3′)	3″	(0.3′)
B-C	Driveway grade change: 4′ vertical curve from up-grade drive in street to down-grade drive on lot	0″	(0.0′)	0″	(0.0′)
C-D	Driveway down-grade to point 10 feet out from building line: 14′ at 1⅝″/ft. (13.5%)	-23″	(-1.9′)	-23″	(-1.9′)
D-E	Front swale: 16′ at ¼″/ft. (2%)	4″	(0.3′)	2″	(0.2′)
E-F	Protective front slope up from high-point of swales	6″	(0.5′)	6″	(0.5′)
	Sub-total A-F from curb-top to ground at building	-10″	(-0.8′)	-8″	(-0.7′)
	Minimum fall from curb-top to slab floor: -10″ + 8″	-2″	(-0.2′)	0″	(0.0′)
	Minimum rise for wood floor using 8″ joists: -10″ + 19″	+9″	(0.8′)	+11″	(0.9′)

tion and the street center-line elevation.

The minimum street-to-floor rise for any lot is found by adding and subtracting the required rises and permitted falls along the lot grading control line for the property. The method is illustrated by the sample computation accompanying each of the three lot grading diagrams. For actual building operations, the relationship should be figured out specifically for each lot or group of typical lots because such factors as building setback, building depth, lot width and swale gradient may change the relationship considerably.

Minimum gradients for grass swales and other unpaved areas depend upon practical limits on precision in grading and maintaining land surfaces and upon the capacity of the ground to percolate water held back by surface texture and depressions. A gradient of ¼ inch-per-foot (2%) is a practical minimum in areas subject to ground frost. Flatter gradients are usable, however, where the supplementary ground percolation at all seasons is adequate to prevent any prolonged saturation of soil or standing water. For example, ⅛ inch per foot (1%) is satisfactory on sandy well-drained soils in areas not subject to ground frost.

General limitations for protective slopes around buildings and for other elements affecting the lot grading control line are outlined in Section 800 of FHA Minimum Property Requirements. If necessary the control line sometimes may be flattened satisfactorily by special methods, such as using a paved driveway as a side-yard drainage channel at 1 16 inch per foot (½%) instead of a grass swale at ¼ inch per foot (2%).

Floor elevation in relation to outside finish grade must be high enough to protect wood construction from moisture and insects. With 8″ minimum from ground to wood sill, the minimum ground-to-floor rise is as follows for typical construction:

Concrete slab on ground	8″	(0.7′)
Wood floor framing, 8″ joists	19″	(1.6′)
Wood floor framing, 10″ joists	21″	(1.8′)

For Lot Grading Type C which drains away from the street, the lowest floor elevation in relation to street grade is

also affected by maximum driveway gradient and by local custom and acceptance of properties below the grade of the abutting street.

It should also be recognized that there are other lot grading types not illustrated here; each will have its own grading control line which will govern its minimum street-to-floor rise.

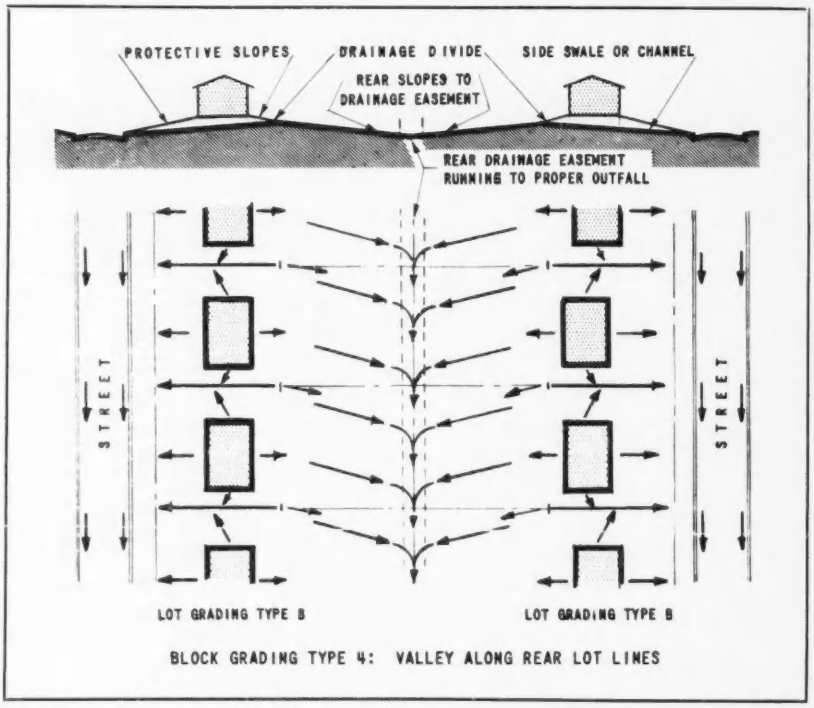
Adjustments to Each Property

After the minimum lot grading control line and minimum street-to-floor rise have been determined, they should be adjusted upward as suitable for existing topography and other conditions of each property.

For a house with a basement, check is made of elevations of drains for basement floor and any basement plumbing fixtures. For a house with a crawl space, floor elevation is checked for height of access space and drainage of interior ground (MPR 403-B). For a concrete slab house, floor elevation is checked against excessive depth of fill under the slab (MPR 406-E).

Then general lot grading is checked for feasibility and suitability. Proposed grades at any necessary additional key points are determined, and all grades are further adjusted as needed. These additional points and adjustments cover such items as grades of walk and driveway, variation of outside finish grade along building walls, width and gradients of usable yard areas, and transition to grades of adjoining properties.

After all key elevations have been properly determined by these adjustments in the planning stage, then execution of good grading on the ground is relatively easy. Care must be taken primarily to set grade stakes correctly at key points and to build and grade to them in accordance with the practices outlined in this data sheet and in the FHA Minimum Property Requirements.



BLOCK GRADING TYPE 4: VALLEY ALONG REAR LOT LINES

U.L.I. ACTIVITIES— PRESENT AND FUTURE

(*Continued from Page 2*)

member's library. Price to members is $8.

Technical Bulletin No. 22 will be available to members within the month. Prepared by outstanding men in the field of urban land economics and city planning, it presents for the first time in print a practical approach to the problems of the established outlying or satellite business district, which has been all but forgotten in the development of new suburban shopping centers.

URBAN LAND, U. L. I.'s monthly bulletin, has scheduled a number of articles of more than usual interest which will appear in subsequent issues.

BROADER PLANNING STRESSED IN NEW HOUSING AND REDEVELOPMENT BILL

(*Continued from Page 2*)

on private property and the cost of enforcing local codes and standards.

An important element, long advocated by U.L.I., would be the repeal of the present requirement that a redevelopment area must be predominantly residential either before or after it is rebuilt.

Renewal programs would be required to mesh into general plans for the future development of the city and its environs. This emphasis on proper planning is underlined by a special provision authorizing a $5 million fund from which to make 50 per cent grants to aid official bodies engaged in metropolitan and regional area planning, as well as to state planning agencies for the purpose of assisting municipalities under 25,000 population with urban planning.

To encourage rehabilitation and construction of housing by private owners, much of the bill is devoted to a simplification and liberalization of the present system of FHA mortgage insurance. The President would be given authority to increase loan limitations, to lengthen amortization periods, and in other ways make it easier to finance the repair, rehabilitation and construction of single-family homes and apartments, both within and outside of urban renewal areas. The same terms would be made applicable to both new and existing housing.

To ease the problem of relocating families displaced by slum clearance, by enforcement of health and safety regulations, and by other public improvements, such families would be given preference for admission to public housing. There is also provision for a special type of FHA insurance for displaced families, under limited circumstances, on mortgages of not more than $7,000 covering 100 percent loans to be repaid over a 40-year period. The only cash required would be $200 to cover closing costs.

The bill would revive the suspended program of federal loans to finance the advance planning of local public works, re-charter and change the form of the Federal National Mortgage Association to bring in private capital, and make numerous other changes recommended by the President's Advisory Committee on Government Housing Policies and Programs and by President Eisenhower in his special message to Congress on January 25.